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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY SOCKET NO.
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EXAMINER

VARCOE JR, F

ART UNIT

PAPER NUMBER

1764

DATE MAILED:

12/05/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/252,507

Applicant(s)

Held

Examiner

Varcoe

Group Art Unit
1764

☒ Responsive to communication(s) filed on May 18, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle* 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) 1-44 is/are pending in the applicat

Of the above, claim(s) 33-44 is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-32 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☒ Claims 1-44 are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☒ The drawing(s) filed on Feb 18, 1999 is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been
☒ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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DETAILED ACTION

Election/Restriction

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-32, drawn to an apparatus, classified in class 422, subclass 171.
 - II. Claims 33-44, drawn to a process, classified in class 423, subclass 212+.
2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used for another and materially different process such as the production of sulfur from the reaction between H₂S gas and SO₂ gas.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. Mr. Ronald Hildreth left a telephone message on November 27, 2000, making a provisional election without traverse to prosecute the invention of group I,

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claims 1-32. Affirmation of this election must be made by applicant in replying to this Office action. Claims 33-44 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Drawings

5. The drawings are objected to because in the specification on page 8 line 22, reference is made to “a tank 6 (not shown).” Reference numbers are usually for items that appear in the drawings. The number 6 appears in the drawing, but without the tank. The drawing and the specification should agree. Correction is required.

Claim Objections

6. Claims 1 and 11 are objected to because of the following informalities:

With regard to claim 1, should line 6 read “absorption of at least”?

With regard to claim 11, last line is “50 cm” a typographical error? Separations of at least one half meter would result in the apparatus being quite large.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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8. Claims 1-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claim 1, it is not clear what is intended by “enlarged” in line 5. What is it larger than?

With regard to claim 7, line 2 recites “passages having a closed cross-section.” It is not clear how at gas can pass through a passage that is closed.

With regard to claims 12-14, it is not clear what is intended by “enlarged” in line 2. What is it larger than?

With regard to claim 20, in line 2 “low” is indefinite. Furthermore, it is not clear that it is the presence of the reducing atmosphere that causes the release. The claim can be interpreted as describing an intended use of the apparatus wherein the temperature is raised while a reducing atmosphere is present, causing a temperature-controlled release that happens to occur in a reducing atmosphere.

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With regard to claim 21, line 5 cites “charging or discharging.” It is not clear what it is that constitutes a charge. Is it electrical? Is it a portion of oxide gas?

With regard to claims 21 and 23, it would be clearer if “oxygen concentration determining means” and “temperature determining means” were re-written “oxygen concentration measuring means” and “temperature measuring means.”

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1 and 17-24, 28, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeshima et al. U.S. Patent No. 5,388,406.

With regard to claim 1, Takeshima discloses an internal combustion engine arrangement comprising a spark-ignited internal combustion engine. (Takeshima’s claim 20, which depends on claim 1, specifies diesel, implying that claim 1 comprehends both diesel and spark-ignited engines.) Takeshima discloses an exhaust line receiving exhaust gas from the internal combustion engine (Takeshima claim 1). Takeshima discloses an oxide gas absorber in the

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exhaust line (claim 1) including a support member having an absorption layer on a surface exposed to a flow of gas and capable of reversibly absorbing at least one nitrogen oxide and/or at least one oxide of sulfur (Takeshima column 1 line 60 to column 2 line 2).

Takeshima discloses a control unit (ECU column 4 lines 1-13) for controlling the temperature of the absorption layer by adjusting parameters of the exhaust gas so that the absorption layer can be heated to a temperature at which the layer is regenerated by desorbing absorbed NO_x or SO_x.

With regard to claims 17 and 18, Takeshima discloses an absorption layer containing an element selected from the group consisting of alkali metals, alkaline earth metals, rare earths, lanthanum, titanium, copper and manganese (Takeshima column 4 lines 37-40), and where the absorption layer contains at least one of the elements barium, sodium and potassium (Takeshima column 4 lines 37-40).

With regard to claim 19, absorption from an exhaust gas with an excess of oxygen during lean operation of the internal combustion engine is an intended use and does not patentably distinguish the claim from the prior art.

With regard to claim 20, Takeshima discloses an absorbing layer releasing at least one of NO_x and SO_x in a reducing atmosphere or at low oxygen concentration (column 1 lines 32-35).

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With regard to claim 21, Takeshima discloses an oxygen detection means (Figure 8 (74)) for providing a signal representing the oxygen concentration in the exhaust gas. Takeshima discloses control means for receiving a signal (66) representing oxygen concentration and causing charging or discharging of the absorption layer (column 9 lines 41-58).

With regard to claim 22, Takeshima discloses an absorption layer that releases at least one of NO_x and SO_x at an elevated temperature (Abstract).

With regard to claim 23, Takeshima discloses a temperature measuring means (16) and control means (66) for receiving the temperature signal and controlling charging or discharging of the gas absorption layer (column 9 lines 41-58).

With regard to claim 24, Takeshima discloses an arrangement comprising oxygen detecting means (Figure 8 (74)) generating a signal supplied to the control means (66). Takeshima also discloses a temperature measuring means (16) and control means (66) for receiving the temperature signal and controlling charging or discharging of the gas absorption layer (column 9 lines 41-58).

With regard to claim 28 Takeshima discloses an absorption layer including a precious metal (column 4 line 40).

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With regard to claim 29 Takeshima discloses an absorption layer including an oxidation catalyst and a three-way catalyst (claim 16) containing the precious metal (column 4 line 40).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 2-11, 15, 16 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshima et al. U.S. Patent No. 5,388,406, as applied to claim 1 above, in view of Cornelison et al. U.S. Patent No. 5,240,682.

With regard to claim 2, Takeshima discloses essentially the same invention as that of the instant claim but fails expressly to disclose a metal support member.

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Cornelison discloses a metal support member.

Cornelison and Takeshima are analogous art in that both deal with exhaust gas NO_x removal.

At the time of the invention it would have been obvious to one skilled in the art to use the support material of Cornelison with the apparatus to Takeshima.

The motivation would have been to utilize a metal thickness that was thin enough to be light weight and capable of accepting corrugation in a non-nesting pattern, such as herringbone or chevron and capable of over-folding (Cornelison column 4 lines 16-29).

With regard to claim 3, Cornelison discloses a metal support member that is a metal sheet or foil (Cornelison column 4 lines 16-29).

With regard to claim 4, the modified apparatus of Takeshima discloses a metal support member heatable by application of electric current (Takeshima column 3 line 43).

With regard to claims 5 and 6, Cornelison discloses a support member having a wall thickness less than or equal to 0.16 mm in the region provided with the absorption layer (column 4 lines 26-29). Specifically, Cornelison discloses a thickness of 0.0406 mm (0.0016 inches).

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The motivation for combining metal support material this thin would have been to utilize a thickness that was thin enough to be light weight and capable of accepting corrugation in a non-nesting pattern, such as herringbone or chevron and capable of over-folding (Cornelison column 4 lines 16-29). Cornelison discloses a metal support member with a wall thickness less than 0.1 mm and 0.05 mm (column 4 lines 16-29). (A thickness of 0.001 inch is equal to 0.0254 mm, which is less than 0.05 mm.)

With regard to claims 7-11, it is well-known in the art, as disclosed by Cornelison, to build exhaust treatment devices using a variety of internal shapes and configurations, including parallel passages with closed cross-section, structures that render the flow turbulent, corrugation, subdivided passages, and features having various lengths, cross sections and numbers of passages.

With regard to claims 15 and 16, Cornelison discloses an absorption layer containing gamma aluminum oxide (column 1 line 31).

With regard to claim 25 and 26, Cornelison discloses a support member made of a ceramic material (column 1 line 23) and of a metal foil (Abstract). The thickness of the absorption layer is a result-effective variable. It would have been obvious to one skilled in the art

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to experimentally determine the thickness that is thick enough to hold a sufficient amount of oxide gas without being so thick as to require unacceptably long purge times.

With regard to claim 27, Cornelison discloses an absorption layer applied as a wash coat (column 1 line 30).

13. Claims 12-14 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshima et al. U.S. Patent No. 5,388,406 as applied to claim 1 above, in view of Neal et al., U.S. Patent No. 4,755,499.

With regard to claims 12-14, Takeshima discloses essentially the same invention as the instant claims but fails expressly to disclose an absorption surface with an area of at least 20 M². Neal discloses an alumina substrate with a surface area above 100 square meters per gram (Neal column 5 line 30). This is above the lower limits presented in claims 12-14.

Neal and Takeshima are analogous art in that both deal with removing nitrogen oxides and sulfur oxides from gas streams.

At the time of the invention it would have been obvious to one skilled in the art to use material with a high absorption surface like that of Neal in the apparatus of Takeshima.

The motivation would have been to use sorbents that are outstandingly effective for the removal of nitrogen oxides and sulfur oxides from waste gas streams (Neal Abstract).

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With regard to claim 30, Neal discloses an absorption layer with a pore volume of at least 0.2 cubic centimeters per gram of mass (column 6 lines 1-4).

With regard to claims 31 and 32, Takeshima discloses a separate oxidation catalyst exposed to the flow of gas (column 8 lines 38-40). Three-way catalysts catalyze oxidation.

Double Patenting

14. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

15. Claims 1-32 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-32 of copending Application No. 09/252506. This is a provisional obviousness-type double patenting rejection.

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Claims 1-32 of the present application are provisionally rejected as being obvious in view of claims 1-32 of the '506 application because the only substantive difference between the two sets of claims is that the claims of the present application further include an internal combustion engine. Since the apparatus of the '506 application is intended for use with an internal combustion engine, it would have been obvious to attach such an engine to the apparatus of the '506 application to get the claims of the present application.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Varcoe, whose telephone number is (703) 306-5477. The examiner can normally be reached Monday through Friday from 9:00 am to 5:00 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode, can be reached on (703) 308-4311.

The FAX telephone number for this Group Art Unit is (703) 305-3599 (for Official papers after Final), (703) 305-5408 (for other Official papers) and (703) 305-6357 (for Unofficial papers).

When filing a FAX in Group 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of the application. This will expedite processing your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

RV
November 29, 2000


Shrive Beck
Supervisory Patent Examiner
Technology Center 1700